Global Observations of SO_2 from Aura/OMI:
Latest Product Updates and *Science Analyses*

Can Li[1,2], Nick Krotkov[2], Joanna Joiner[2], Simon Carn[3], Yan Zhang[1,2], Peter Leonard[4], Chris McLinden[5], Vitali Fioletov[5]

[1]UMD/ESSIC, [2]NASA/GSFC, [3]Michigan Tech., [4]ADNET, [5]Environ. Canada

Aura Science Team Meeting

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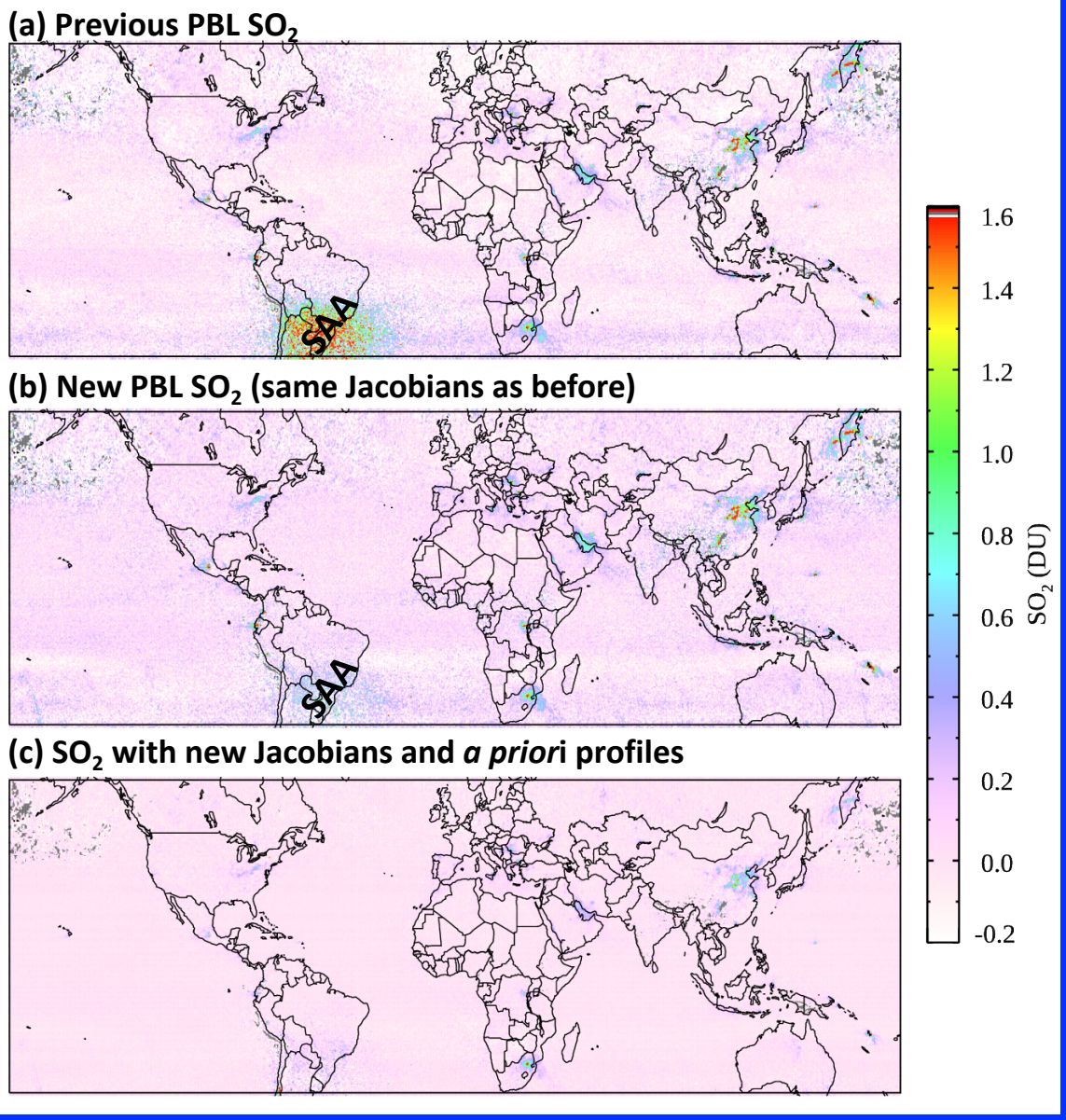
Email: can.li@nasa.gov

With Help from the OMTO3 & OMCLDRR Teams and SIPS

Updates in the New Version OMI Anthropogenic SO_2 Product

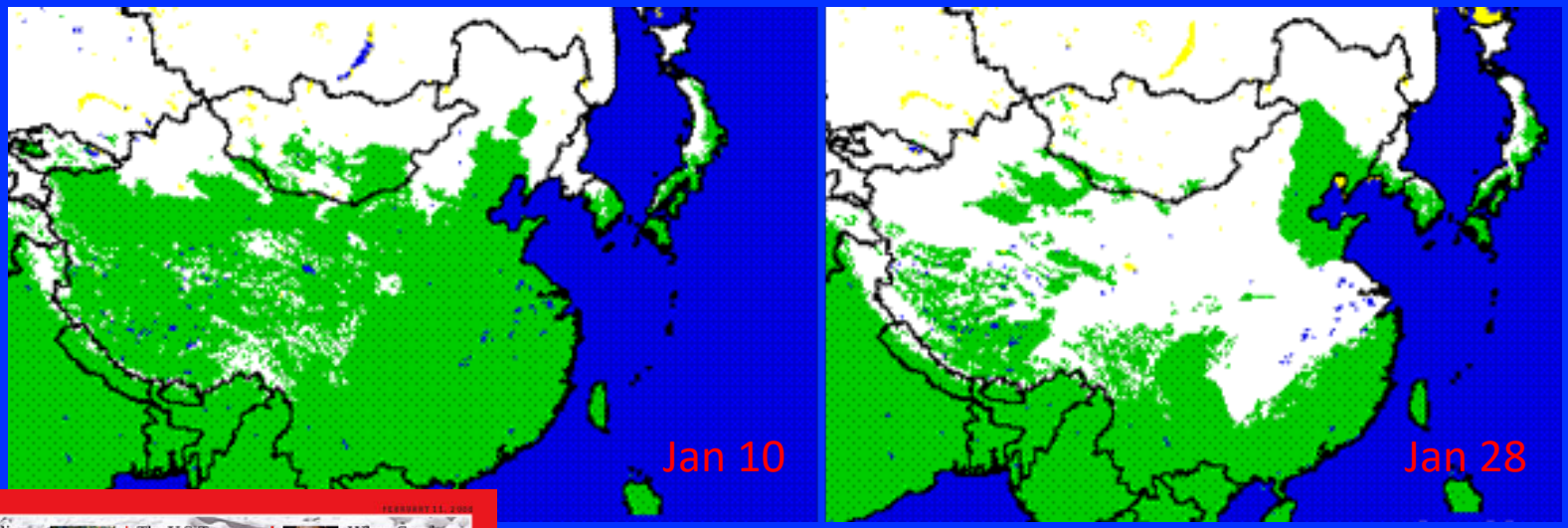
- New data prescreening scheme:
  - To exclude large volcanic signals and reduce their impacts on PCA;
- Updated spectral fitting scheme:
  - To reduce noise over areas affected by the South Atlantic Anomaly (SAA);
- New SO_2 Jacobians Lookup Table:
  - To better account for the effects of geometry, O_3, cloudiness, surface reflectivity *etc.;*
- New *a priori* profiles based on GEOS-5 simulations:
  - More realistic than the previous assumption with fixed PBL profile everywhere;
- Enhanced retrievals over snow/ice:
  - Use Raman cloud product to identify cloud-free pixels covered by snow/ice;
  - Use scene reflectivity in calculations of Jacobians.

Monthly Mean SO_2 VCD, July 2007

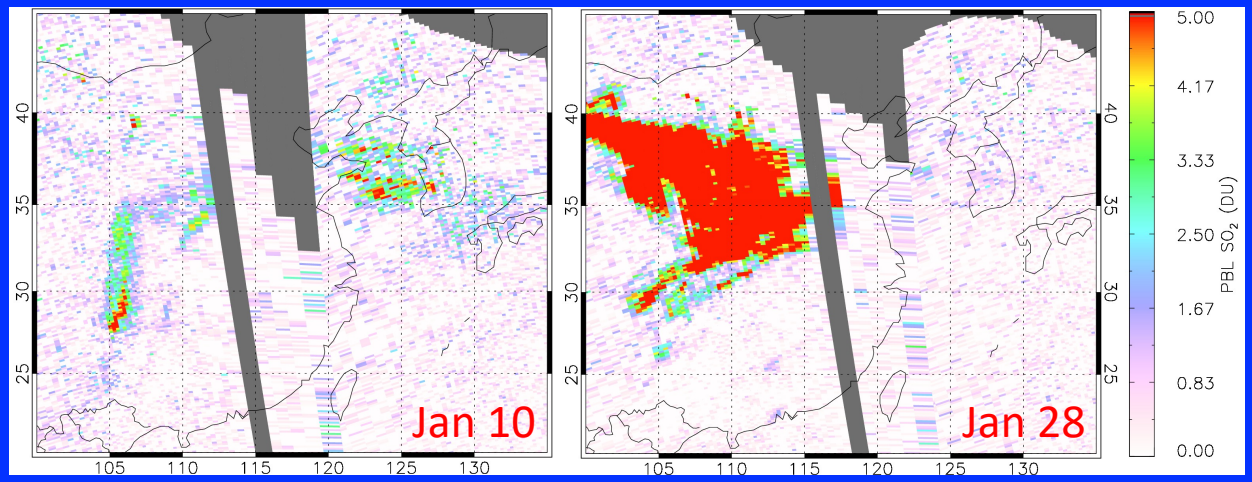


- ✓ For the same PBL SO_2 Jacobians (AMF), results are similar, except for areas affected by South Atlantic Anomaly (SAA);
- ✓ **New SO_2 Jacobians and *a priori* profiles significantly further reduce retrieval artifacts**.

Revisiting the 2008 Snow Storm in China

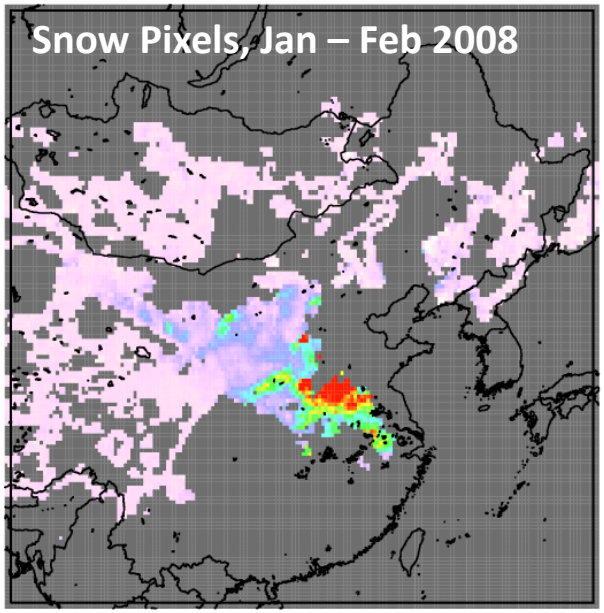


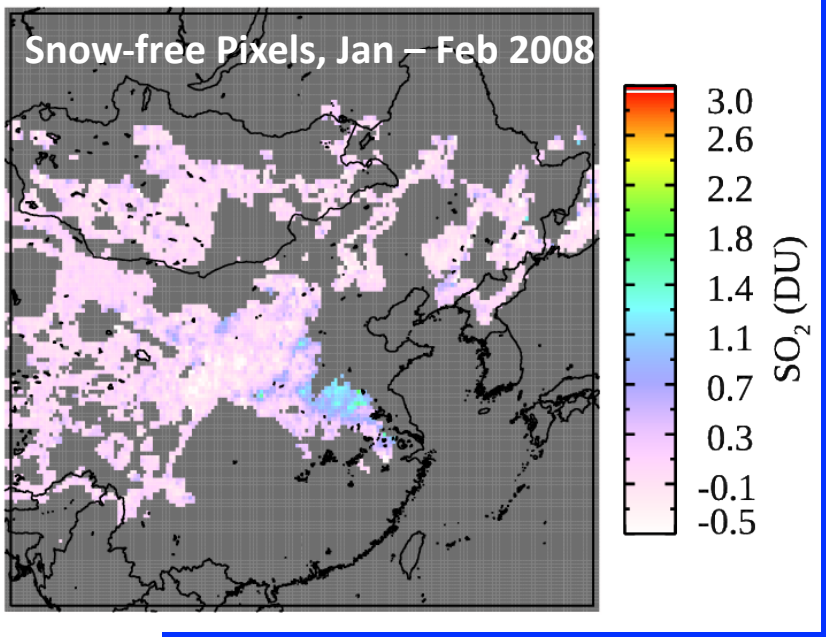
"China's worst snowstorms in nearly 50 years" – from USDA Commodity Intelligence Report, February 1, 2008

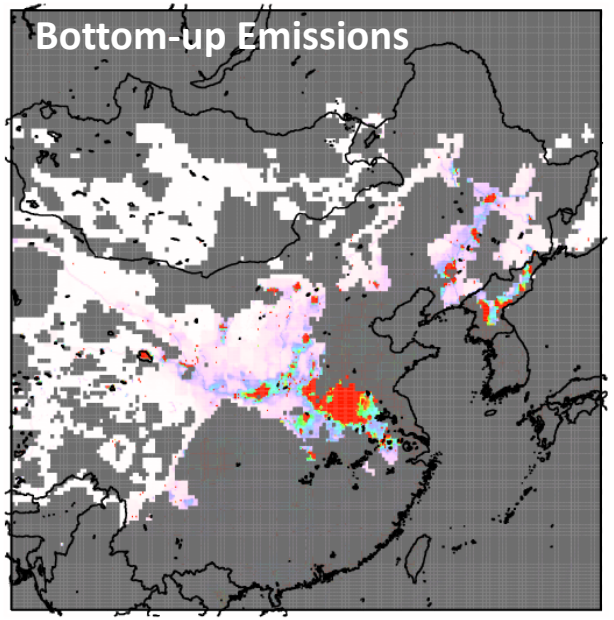


Significantly higher apparent SO_2 signals after the snow storm (old PBL SO_2 product).

Revisiting the 2008 Snow Storm in China



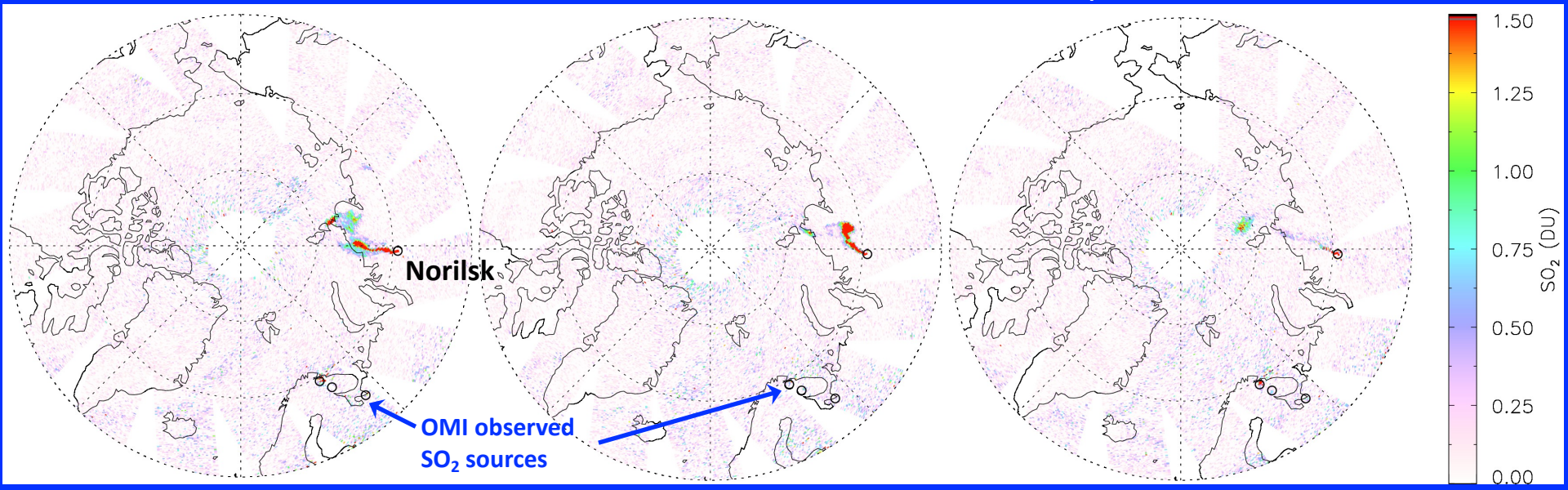




Snow/ice enhances near-surface SO_2 signals, allowing sources along Yellow River, and Hexi Corridor to be more readily identified, as compared with snow-free pixels.

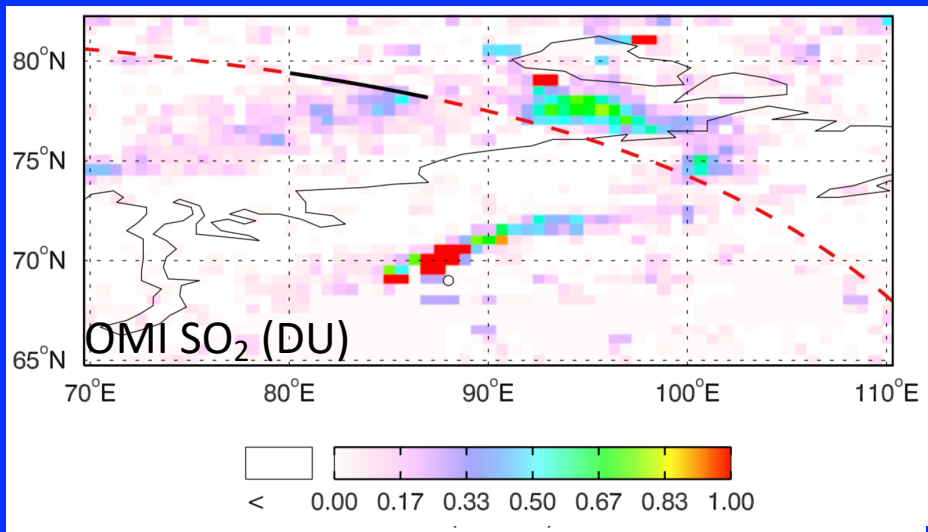
Extended Coverage: Insights into Transport to the Arctic

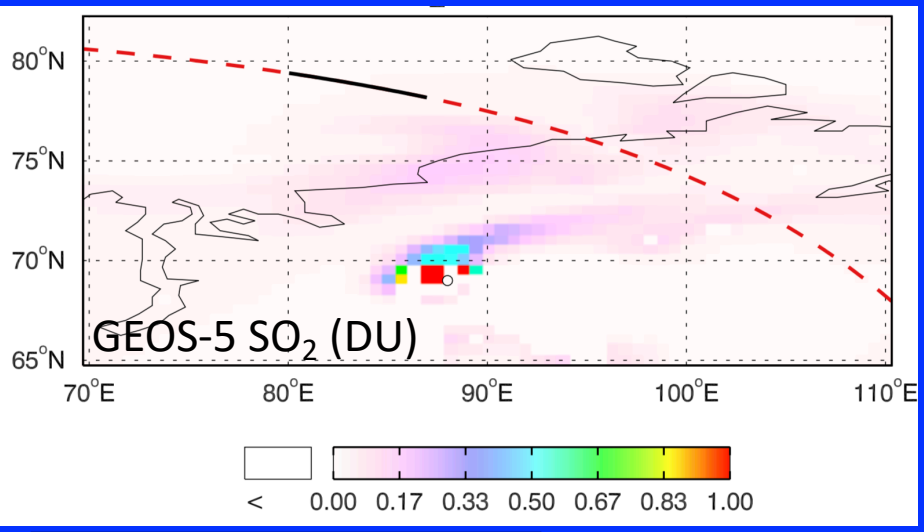
April, 16, 2007 April, 17, 2007 April, 18, 2007

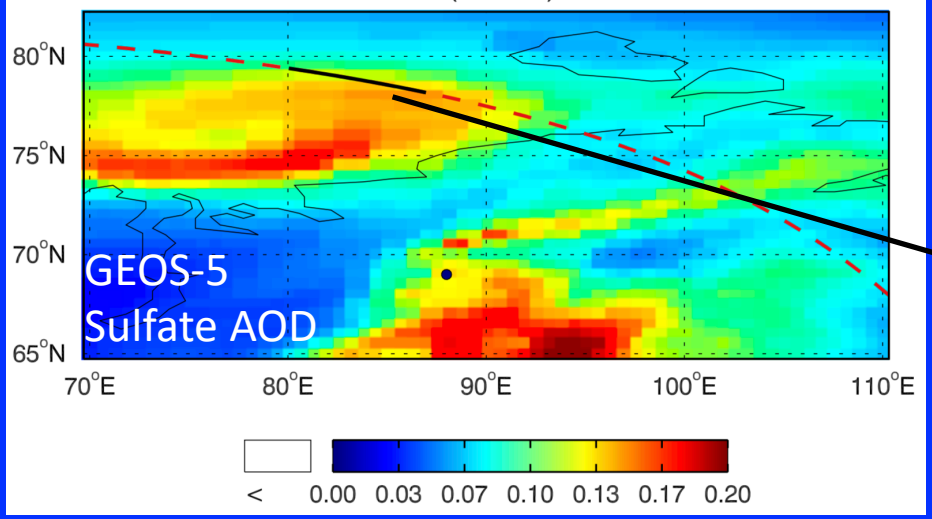


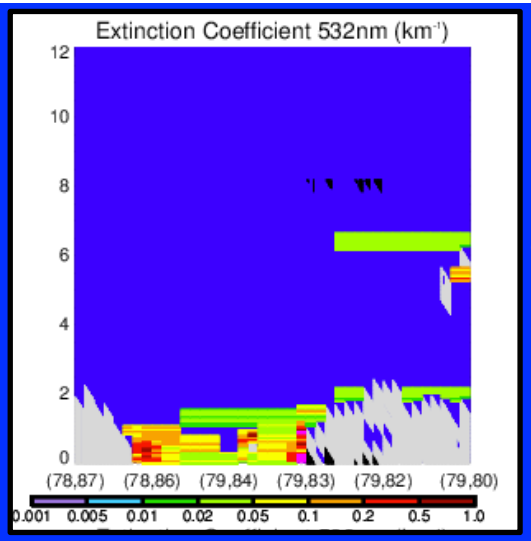
- Highly reflective snow/ice covered surface also enhances sensitivity to SO_2, even at large solar zenith angles (SZA);
- For the case study here, retrievals are extended to SZA < 81° for near nadir pixels;
- Updated retrievals over snow/ice capture SO_2 plumes from large sources in high-latitude areas (such as Norilsk) on a daily basis – potentially contribute to Arctic haze.

A Case of Transport to the Arctic (April 2, 2007)









CALIPSO Aerosol Extinction Profile

- Model underestimates SO_2 transport from Norilsk ("missing source"!).
- Combined OMI/CALIPSO analysis may help to evaluate gas-to-particle conversion in model during transport.

Courtesy:
J. Liu@GSFC/USRA

Status and Next Steps

- Data production ongoing (to be finished in the next few weeks).
- Public release of the new OMSO2 product expected in the next 1-2 months (after data production and quality check).